10499- Alternatives to Duplicate Diet Methodology, J. R. Tomerlin (2), L. M. Barraj (2), L. Melnyk (3), M. R. Berry (3) S. M. Gordon (1)

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Duplicate Diet (DD) methodology has been used to collect information about the dietary exposure component in the context of total exposure studies. DD methods have been used to characterize the dietary exposure component in the NHEXAS pilot studies. NERL desired to evaluate its current DD methodology to determine if alternative methods could provide 1) the same amount of information for less cost or 2) additional information for approximately the same cost. Four alternatives were formulated for a public workshop to discuss each in detail: 1 – the Cyclic Sub-Portion Duplicate Diet (CSPDD) is intended to greatly reduce the amount of material that is handled during the laboratory phase of a total exposure study. The CSPDD accomplishes this by requiring study participants to collect only a small sub-sample from each food consumed during the day instead of an exact duplicate portion. The CSPDD incorporates detailed food diaries and/or photographic records to record total amount of food consumed. The sampling procedure and subsequent sample analysis is repeated through multiple cycles. 2 – The Sub-Population Duplicate Diet (SPDD) combines a food frequency questionnaire administered to the entire sample population with a standard DD administered to a statistically representative sub-sample of the target population. 3 – The Targeted Foods Duplicate Diet (TFDD) uses available information to identify “target” foods which are likely to contain the contaminants of interest. The targeted foods are collected separately from non-target foods, and detailed written or photographic records are kept for portion size and food consumption. 4 – The Total Population Diet (TPD) preselects foods and beverages presumed to be associated with the contaminants of interest. Eligible households are identified, and prescreened by questionnaire to determine which, of any, of the preselected foods they normally consume. Information is also obtained bout the households typical diet. Specific households are directed to prepare, eat and retain individual samples of selected target foods and beverages on the days of the field study. The foods consumed are weighed and the amounts are recorded, as is information about food preparation. Samples are composited according to food groupings (e.g., meats, vegetables) and in proportion to reported portion size, so that relative contribution of specific food groups is possible. The public workshop included the convening of a panel of experts to offer recommendations about which method, if any, to investigate further. In general, the workshop consensus was the current DD methodology has worked well. The workshop thought that the CSPDD alternative might be worth investigating further because of its potential to significantly reduce study costs. The workshop also concluded that the TFDD might have some utility, but only under certain specific study conditions.

10723- An integrated approach in setting Air Quality Objective (AQO) according to population average intervention strategy

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Objective: In recent years estimation of short-term health effects of air pollutants in ambient air has been increasingly based on daily time-series studies. Exposure-response relationships with no risk-free threshold level were frequently observed. But the state-of-the-art methods in setting air quality guideline and standard are still dependent on determination of a safety and an acceptable level. The objective of this study is to develop an integrated approach in setting an AQO or standard, using results from daily time-series studies and without considering a safety level. Methods: Daily variations of hospital admission counts due to cardiorespiratory diseases were modeled, using Poisson regression according to study guideline of the Air Pollution and Health: a European Approach. Air pollutant concentrations were transformed to percentile/100 scale, **x**, and were fitted into the model to obtain a linear exposure-response curve and a gradient, **b** per 100 percentile. If there is a government intervention which has an effect to produce a displacement in the distribution of **x** so that the maximum shifted by an amount **a**, the reduction in risk is derived to be 1/2 **b** (1 - **a**^2). The value of **a** represents an AQO to be targeted in a year. The value of 365(1-**a**) is the number of days exceeding the objective before implementing any air quality intervention. It can be used as a reference value in monitoring whether there is any reduction in number exceeding the AQO. Results: When the AQO is achieved, the numbers of hospital admissions avoidable are shown in the following table, using NO_2 as an example.

Table 1: The expected numbers of hospital admissions avoidable in a year if an AQO for NO_2 has been set and achieved at a percentile level.

	Percentile									
Disease	90	80	70	60	50	40	30	20	10	0
Respiratory[1] (Total 80,000)	250	474	671	842	987	1106	1198	1126	1303	1316
Cardiovascular[2] (Total 60,000)	247	469	664	834	977	1094	1186	1251	1290	1303

Note:
1. The gradient b = 3.292×10^{-2} per 100 percentile
2. The gradient b = 4.345×10^{-2} per 100 percentile

Conclusion: A simple approach can be used in setting AQO which integrates three elements: (1) an exposure-response curve obtained from daily time-series study; (2) an AQO set according to a population average intervention strategy; and (3) a mechanism of monitoring as part of a public health tool.